

CLAIMS

1. An apparatus for forming curved laminations, comprising:
- 5 a planar horizontal surface;
- 10 a first die board, said first die board having a planar lower surface, a first curved upper surface, a first predetermined thickness, first and second sides and first and second ends;
- 15 said planar lower surface being disposed upon said planar horizontal surface;
- 20 a plurality of lamination support members, said support members having parallel top and bottom surfaces, first and second sides, first and second ends, a second predetermined thickness;
- 25 said bottom surfaces of said lamination support members being disposed upon said first curved upper surface of said first die board; and
- 30 whereby, when the planar lower surface of said first die board is disposed upon said horizontal surface and said lamination support members are disposed upon the first curved upper surface of the first die board with the bottom surface adjacent the second end of the lamination support members disposed upon the horizontal surface, the top surfaces of the lamination support members will reflect the first curved upper surface of the first die board above a point where the lamination support members contact said first upper surface and provide a curved surface for laminating veneer portions.

2. An apparatus for forming curved laminations as described in Claim 1, further comprising:
- a second die board, said second die board having a planar lower surface, a second curved upper surface, a third predetermined thickness, first and second sides and first and second ends;
- 5 said planar lower surface of said second die board being disposed upon said planar horizontal surface;
- said bottom surfaces of said lamination support members being disposed upon said first and second curved upper surfaces of said first and second die boards; and
- 10 whereby, when the planar lower surfaces of said first and second die boards are disposed upon said horizontal surface and said lamination support members are disposed upon the first and second curved upper surfaces of said first and second die boards, the top surfaces of the lamination support members will reflect the first and second curved upper surfaces of the first and second die boards and provide a curved surface for laminating veneer portions.
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3. An apparatus for forming curved laminations as Described in Claim 1 wherein the lamination support members are cylindrical in cross-section.
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4. An apparatus for forming curved laminations as Described in Claim 1, wherein:
- said lamination support members are substantially rectangular in cross-section;

5 said first side of said lamination support member including a rounded projecting tongue and said second side of said lamination support member including a mating rounded, receiving notch; and whereby, adjacent lamination support members will fit more closely together

10 while following the first curved upper surface of said first die board, thereby forming a smoother surface upon which veneer portions are laminated.

- 15 5. An apparatus for forming curved laminations as described in Claim 1, further comprising:
- 10 an insulating sheet, said insulating sheet being formed of thin, flexible, resilient material;
- 15 said insulating sheet being disposed between top surfaces of the lamination support members and a lower surface of a veneer portion being laminated upon said lamination support members; and whereby, when said insulating sheet is inserted between the lamination support members and the lower surface of a veneer portion indentations in a lamination resulting from contact with top surfaces of the lamination support members will be minimized.

- 20 6. An apparatus for forming curved laminations, comprising:
- a planar horizontal surface;

a first die board, said first die board having a planar lower surface, a first curved upper surface, a first predetermined thickness, first and second sides and first and second ends;

5 said planar lower surface of said first die board being disposed upon said planar horizontal surface;

a plurality of lamination support members, said support members having parallel top and bottom surfaces, first and second sides, first and second ends, a fourth predetermined thickness and a first notch disposed upon said bottom surface and spaced inwardly from said first end;

10 said first notch having first and second side walls and a first upper bearing surface;

said first notch being sized and shaped to fit slidably over said first predetermined thickness of said first die board;

15 said first upper bearing surface being disposed upon said first curved upper surface; and

whereby, when the planar lower surface of said first die board is disposed upon said horizontal surface and said first notches of said lamination support members are disposed upon the first curved upper surface of the first die board with the bottom surface adjacent the second end of the

20 lamination support members disposed upon the horizontal surface, the top surfaces of the lamination support members will reflect the first curved upper surface of the first die board above a point where the first

notches contact said first upper surface and provide a curved surface for laminating veneer portions.

7. An apparatus for forming curved laminations as described in Claim 6, further
5 comprising:

a second die board, said second die board having a planar lower surface, a
second curved upper surface, the first predetermined thickness, first and
second sides and first and second ends;

said planar lower surface of said second die board being disposed upon said
10 planar horizontal surface;

a second notch, said second notch being disposed upon said bottom surface and
being spaced inwardly from the second end of said lamination support
members;

said second notch having first and second side walls and a second upper
15 bearing surface;

said second notch being sized and shaped to fit slidably over said first
predetermined thickness of said second die board;

said second upper bearing surface being disposed upon said second curved
upper surface; and

20 whereby, when the planar lower surfaces of said first and second die boards are
disposed upon said horizontal surface and said first and second notches
of said lamination support members are disposed upon the first and
second curved upper surfaces of said first and second die boards, the

top surfaces of the lamination support members will reflect the first and second curved upper surfaces of the first and second die boards and provide a curved surface for laminating veneer portions.

5 8. An apparatus for forming curved laminations as described in Claim 6, further comprising:

an insulating sheet, said insulating sheet being formed of thin, flexible, resilient material;

10 said insulating sheet being disposed between top surfaces of the lamination support members and a lower surface of a veneer portion being laminated upon said lamination support members; and

15 whereby, when said insulating sheet is inserted between the lamination support members and the lower surface of a veneer portion indentations in a lamination resulting from contact with top surfaces of the lamination support members will be minimized.

9. An apparatus for forming curved laminations as described in Claim 6, wherein:

20 said first upper bearing surface of said first notch including a downward facing curve;

said downward facing curve having its lowest point at a vertical centerline of said lamination support member; and

whereby, when said first notch of said lamination support members is disposed upon said first curved upper surface of said first die board, with the

bottom surface adjacent the second end of the lamination support members disposed upon the horizontal surface, the top surfaces of the lamination support members will more accurately reflect the first curved upper surface of the first die board above the point where said downward facing curve of said first upper bearing surface of said first notch contacts said first curved upper surface and provide a curved surface for laminating veneer portions.

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10. An apparatus for forming curved laminations as described in Claim 7, wherein:
- 10 said first and second upper bearing surfaces of said first and second notches including downward facing curves;
- 15 said downward facing curves having their lowest points at a vertical centerline of said lamination support member; and
- 20 whereby, when said first and second notches of said lamination support members are disposed upon said first and second curved upper surfaces of said first and second die boards, the top surfaces of the lamination support members will more accurately reflect the first and second curved upper surfaces of the first and second die boards and provide a curved surface for laminating veneer portions.
11. An apparatus for forming curved laminations as described in Claim 6, further comprising:

a series of closely spaced cuts extending orthogonally from said first side to
said second side and from said top surface toward said bottom surface
of said lamination support members;

said cuts permitting said top surfaces to assume a three-dimensional contoured
5 configuration when a three-dimensional object having said
configuration on an upper surface is placed between said horizontal
surface and said bottom surface of said lamination support members;
and

whereby, when said object causes said lamination support members to bend, a
10 surface having compound curves will be formed for laminating veneer
portions.

12. An apparatus for forming curved laminations as described in Claim 6, wherein the first
curved upper surface of the first die board includes an upward facing curve extending
15 from the first side to the second side of said first die board.
13. An apparatus for forming curved laminations as described in Claim 6, wherein the top
surface of each lamination support member includes an upward facing curve extending
20 from the first side to the second side of said member.
14. An apparatus for forming curved laminations as described in Claim 6, wherein:

the first upper bearing surface of said first notch is formed as a portion of an
orifice disposed at a first predetermined distance from the top surface of
the lamination support member; and
the first and second side walls of said first notch extending upwardly from the
5 bottom surface of said support member and intersecting a lower portion
of a perimeter of said orifice.

15. An apparatus for forming curved laminations as described in Claim 14, wherein:
the first upper bearing surface of said first notch includes a downward facing
curve extending from the first side to the second side of said lamination
10 support member; and
said downward facing curve having its lowest point at a vertical centerline of
said lamination support member.

- 15 16. A method for forming curved laminations, comprising:
providing a planar horizontal surface;
preparing a first die board, said first die board having a planar lower surface, a
first curved upper surface, a first predetermined thickness, first and
20 second sides and first and second ends;
said first curved upper surface reflecting a desired curve for at least one end of
a lamination;

providing a plurality of lamination support members, said support members having parallel top and bottom surfaces, first and second sides, first and second ends, a second predetermined thickness;

positioning the lower planar surface of said first die board upon the horizontal surface;

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assembling said lamination support members upon said first die board and with the bottom surface adjacent the second end of the lamination support members disposed upon the horizontal surface;

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providing an insulating sheet, said insulating sheet being formed of thin, flexible, resilient material and being designed to prevent indentations in a lamination resulting from contact with top surfaces of the lamination support members;

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placing said insulating sheet upon the top surfaces of the lamination support members; preparing at least two veneer portions, said veneer portions being sized and shaped to fit above the top surfaces of said lamination support members;

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providing a glue layer between said veneer portions;

placing said veneer portions upon said insulating sheet;

applying pressure to an upper surface of a top veneer portion;

allowing said glue to dry; and

removing the laminated veneer portions from the insulating sheet.

17. A method for forming curved laminations, comprising:

providing a planar horizontal surface;

preparing a first die board, said first die board having a planar lower surface, a first curved upper surface, a first predetermined thickness, first and second sides and first and second ends;

5 said first curved upper surface reflecting a desired curve for at least one end of a lamination;

preparing a second die board, said second die board having a planar lower surface, a second curved upper surface, a third predetermined thickness, first and second sides and first and second ends;

10 said second curved upper surface reflecting a desired curve for at least one end of a lamination;

providing a plurality of lamination support members, said support members having parallel top and bottom surfaces, first and second sides, first and second ends, a second predetermined thickness;

15 positioning the lower planar surfaces of said first and second die boards upon the horizontal surface with the first die board parallel to the second die board, said first die board being spaced from the second die board;

assembling said lamination support members upon said first and second die 20 boards;

providing an insulating sheet, said insulating sheet being formed of thin, flexible, resilient material and being designed to prevent indentations in

a lamination resulting from contact with top surfaces of the lamination support members;

placing said insulating sheet upon the top surfaces of the lamination support members;

5 preparing at least two veneer portions, said veneer portions being sized and shaped to fit above the top surfaces of said lamination support members;

providing a glue layer between said veneer portions;

placing said veneer portions upon said insulating sheet;

10 applying pressure to an upper surface of a top veneer portion;

allowing said glue to dry; and

removing the laminated veneer portions from the insulating sheet.

18. A method for forming curved laminations, comprising:

15 providing a planar horizontal surface;

preparing a first die board, said first die board having a planar lower surface, a first curved upper surface, a first predetermined thickness, first and second sides and first and second ends;

said first curved upper surface reflecting a desired curve for at least one end of 20 a lamination;

providing a plurality of lamination support members, said support members having parallel top and bottom surfaces, first and second sides, first and second ends, a fourth predetermined thickness and a first notch

disposed upon said bottom surface and spaced inwardly from said first end;

5 said first notch having first and second side walls and a first upper bearing surface;

10 said first notch being sized and shaped to fit slidably over said first predetermined thickness of said first die board;

15 positioning the lower planar surface of said first die board upon the horizontal surface;

20 assembling said lamination support members upon said first die board with said first notches engaging said first curved upper surface of said first die board and with the bottom surface adjacent the second end of the lamination support members disposed upon the horizontal surface;

25 providing an insulating sheet, said insulating sheet being formed of thin, flexible, resilient material and being designed to prevent indentations in a lamination resulting from contact with top surfaces of the lamination support members;

30 placing said insulating sheet upon the top surfaces of the lamination support members;

35 preparing at least two veneer portions, said veneer portions being sized and shaped to fit above the top surfaces of said lamination support members;

40 providing a glue layer between said veneer portions; placing said veneer portions upon said insulating sheet;

applying pressure to an upper surface of a top veneer portion;
allowing said glue to dry; and
removing the laminated veneer portions from the insulating sheet.

- 5 19. A method for forming curved laminations, comprising:
- providing a planar horizontal surface;
- 10 preparing a first die board, said first die board having a planar lower surface, a first curved upper surface, a first predetermined thickness, first and second sides and first and second ends;
- said first curved upper surface reflecting a desired curve for at least one end of a lamination;
- 15 preparing a second die board, said second die board having a planar lower surface, a second curved upper surface, said first predetermined thickness, first and second sides and first and second ends;
- said second curved upper surface reflecting a desired curve for at least one end of a lamination;
- 20 providing a plurality of lamination support members, said support members having parallel top and bottom surfaces, first and second sides, first and second ends, a fourth predetermined thickness and first and second notches disposed upon said bottom surface and spaced inwardly from said first end and second end, respectively;
- said first and second notches having first and second side walls and first and second upper bearing surfaces;

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said first and second notches being sized and shaped to fit slidably over said first predetermined thickness of said first and second die boards; positioning the lower planar surfaces of said first and second die boards upon the horizontal surface with the first die board parallel to the second die board, said first die board being spaced from the second die board by a distance separating said first notch from said second notch; assembling said lamination support members upon said first and second die boards with said first and second notches engaging said first and second curved upper surfaces of said first and second die boards; providing an insulating sheet, said insulating sheet being formed of thin, flexible, resilient material and being designed to prevent indentations in a lamination resulting from contact with top surfaces of the lamination support members; placing said insulating sheet upon the top surfaces of the lamination support members; preparing at least two veneer portions, said veneer portions being sized and shaped to fit above the top surfaces of said lamination support members; providing a glue layer between said veneer portions; placing said veneer portions upon said insulating sheet; applying pressure to an upper surface of a top veneer portion; allowing said glue to dry; and removing the laminated veneer portions from the insulating sheet.

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20. A method for forming curved laminations as described in Claims 16-19, wherein
pressure is applied to the upper surface of the top veneer portion by inserting the
apparatus for forming curved laminations together with the veneer portions with
interleaved glue layer disposed upon the insulating sheet, disposed upon the top
surfaces of the lamination support members, into a heavy duty, airtight plastic bag,
5 sealing the bag and evacuating the air from the bag, thereby allowing atmospheric
pressure to conform the veneer portions to the insulating sheet and the top surface of
the lamination support members.

10 21. An apparatus for forming curved laminations, comprising:

a desired lamination profile, said profile including a planar baseline, and an
upper curve;

said baseline having a first end, a second end, and being comprised of a series
15 of equal-sized increments;

said upper curve, defining a height above said baseline for each increment of
the baseline from said first end to said second end;

a plurality of adjacent lamination support members, said support members
20 having parallel top and bottom surfaces, first and second sides, first and
second ends, a fifth predetermined thickness equal to said equal-sized
increment;

each of said adjacent lamination support members having a height equal to the height of the upper curve of the desired lamination profile above the baseline for one of the equal-sized increments;

means for maintaining said adjacent lamination support members in parallel alignment to one another, thereby yielding a curved surface defined by the adjacent top surfaces of said adjacent lamination support members, said curved surface being suitable for laminating veneer portions.

5 22. A method for forming curved laminations, comprising:

10 developing a desired lamination profile, said profile including a planar baseline, and an upper curve;

15 said baseline having a first end, a second end, and being comprised of a series of equal-sized increments;

20 said upper curve, defining a height above said baseline for each increment of the baseline from said first end to said second end;

providing a plurality of adjacent lamination support members, said support members having parallel top and bottom surfaces, first and second sides, first and second ends, a fifth predetermined thickness equal to said equal-sized increment;

each of said adjacent lamination support members having a height equal to the height of the upper curve of the desired lamination profile above the baseline for one of the equal-sized increments;

maintaining said adjacent lamination support members in parallel alignment to one another, thereby yielding a curved surface defined by the adjacent top surfaces of said adjacent lamination support members, said curved surface being suitable for laminating veneer portions;

5 providing an insulating sheet, said insulating sheet being formed of thin, flexible, resilient material and being designed to prevent indentations in a lamination resulting from contact with top surfaces of the adjacent lamination support members;

10 placing said insulating sheet upon the top surfaces of the adjacent lamination support members;

preparing at least two veneer portions, said veneer portions being sized and shaped to fit above the top surfaces of said adjacent lamination support members;

15 providing a glue layer between said veneer portions;

placing said veneer portions upon said insulating sheet;

applying pressure to an upper surface of a top veneer portion;

allowing said glue to dry; and

removing the laminated veneer portions from the insulating sheet.

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23. An apparatus for forming curved laminations, comprising:

a planar horizontal surface;

a first die board, said first die board having a planar lower surface, a first curved upper surface, a first predetermined thickness, first and second sides and first and second ends;

5 said planar lower surface being disposed upon said planar horizontal surface;

10 a plurality of lamination support members, said support members having top and bottom surfaces, first and second sides, first and second ends, a second predetermined thickness;

15 said bottom surfaces of said lamination support members being disposed upon said first curved upper surface of said first die board; and

20 whereby, when the planar lower surface of said first die board is disposed upon said horizontal surface and said lamination support members are disposed upon the first curved upper surface of the first die board with the bottom surface adjacent the second end of the lamination support members disposed upon the horizontal surface, the top surfaces of the lamination support members will reflect the first curved upper surface of the first die board above a point where the lamination support members contact said first upper surface and provide a curved surface for laminating veneer portions.

20 24. An apparatus for forming curved laminations as described in Claim 23, further comprising:

a second die board, said second die board having a planar lower surface, a second curved upper surface, a third predetermined thickness, first and second sides and first and second ends;

5 said planar lower surface of said second die board being disposed upon said planar horizontal surface;

10 said bottom surfaces of said lamination support members being disposed upon said first and second curved upper surfaces of said first and second die boards; and

15 whereby, when the planar lower surfaces of said first and second die boards are disposed upon said horizontal surface and said lamination support members are disposed upon the first and second curved upper surfaces of said first and second die boards, the top surfaces of the lamination support members will reflect the first and second curved upper surfaces of the first and second die boards and provide a curved surface for laminating veneer portions.

25. An apparatus for forming curved laminations, comprising:

a planar horizontal surface;

20 a first die board, said first die board having a planar lower surface, a first curved upper surface, a first predetermined thickness, first and second sides and first and second ends;

25 said planar lower surface of said first die board being disposed upon said planar horizontal surface;

a plurality of lamination support members, said support members having top

and bottom surfaces, first and second sides, first and second ends, a

fourth predetermined thickness and a first notch disposed upon said

bottom surface and spaced inwardly from said first end;

5 said first notch having first and second side walls and a first upper bearing

surface;

said first notch being sized and shaped to fit slidably over said first

predetermined thickness of said first die board;

10 said first upper bearing surface being disposed upon said first curved upper

surface; and

whereby, when the planar lower surface of said first die board is disposed upon

15 said horizontal surface and said first notches of said lamination support

members are disposed upon the first curved upper surface of the first

die board with the bottom surface adjacent the second end of the

lamination support members disposed upon the horizontal surface, the

top surfaces of the lamination support members will reflect the first

20 curved upper surface of the first die board above a point where the first

notches contact said first upper surface and provide a curved surface for

laminating veneer portions.

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26. An apparatus for forming curved laminations as described in Claim 25, further comprising:

a second die board, said second die board having a planar lower surface, a second curved upper surface, the first predetermined thickness, first and second sides and first and second ends;

5 said planar lower surface of said second die board being disposed upon said planar horizontal surface;

a second notch, said second notch being disposed upon said bottom surface and being spaced inwardly from the second end of said lamination support members;

10 said second notch having first and second side walls and a second upper bearing surface;

said second notch being sized and shaped to fit slidably over said first predetermined thickness of said second die board;

said second upper bearing surface being disposed upon said second curved upper surface; and

15 whereby, when the planar lower surfaces of said first and second die boards are disposed upon said horizontal surface and said first and second notches of said lamination support members are disposed upon the first and second curved upper surfaces of said first and second die boards, the top surfaces of the lamination support members will reflect the first and second curved upper surfaces of the first and second die boards and provide a curved surface for laminating veneer portions.

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